

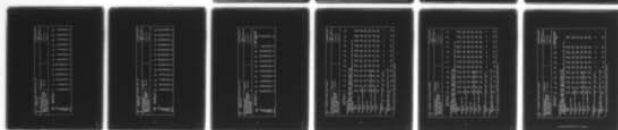
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AEROSPACE MEDICAL RESEARCH LAB WRIGHT-PATTERSON AFB OHIO F/G 20/1
USAF BIOENVIRONMENTAL NOISE DATA HANDBOOK, VOLUME 112. HDU-13/M--ETC(U).
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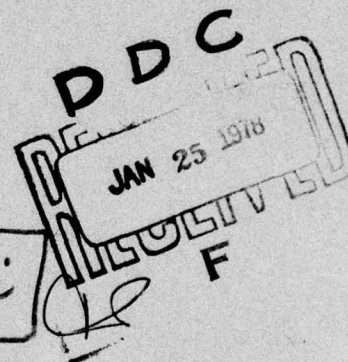


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**USAF BIOENVIRONMENTAL NOISE DATA
HANDBOOK,**

Volume 112,

**HDU-13/M Heater, Explosion Proof,
Duct Type, Portable.**



9 Technical rept.,

10 Nick A. Farinacci

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AEROSPACE MEDICAL RESEARCH LABORATORY
AEROSPACE MEDICAL DIVISION
AIR FORCE SYSTEMS COMMAND
WRIGHT-PATTERSON AIR FORCE BASE, OHIO 45433

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This technical report has been reviewed and is approved for publication.

FOR THE COMMANDER


HENNING E. VON GIERKE
Director
Biodynamics and Bionics Division
Aerospace Medical Research Laboratory

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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER AMRL-TR-75-50, Vol. 112	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) USAF BIOENVIRONMENTAL NOISE DATA HANDBOOK: HDU-13/M Heater, Explosion Proof, Duct Type, Portable	5. TYPE OF REPORT & PERIOD COVERED Volume 112 of a series	
7. AUTHOR(s) Nick A. Farinacci, Capt, USAF, BSC	6. PERFORMING ORG. REPORT NUMBER	
9. PERFORMING ORGANIZATION NAME AND ADDRESS Aerospace Medical Research Laboratory Aerospace Medical Division, Air Force Systems Command, Wright-Patterson AFB OH 45433	8. CONTRACT OR GRANT NUMBER(s)	
11. CONTROLLING OFFICE NAME AND ADDRESS Same as above	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 7231-04-33 62202F 7231-04-36	
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)	12. REPORT DATE December 1976	
	13. NUMBER OF PAGES 18	
	15. SECURITY CLASS. (of this report) Unclassified	
	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE	
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Noise Noise Environments Bioenvironmental Noise Ground Support Equipment HDU-13/M Heater, Explosion Proof, Duct Type, Portable		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The HDU-13/M Heater is an explosion-proof, electric motor-driven, portable ground heater designed to provide heat and ventilating output while operating in an explosive atmosphere such as encountered in the purging of aircraft fuel tanks. This report provides measured data defining the bioacoustic environments produced by this unit operating inside a large aircraft hanger at normal rated conditions. Near-field data are reported for 37 locations in a wide variety of physical and psychoacoustic measures: overall and band sound		

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pressure levels, C-weighted and A-weighted sound levels, preferred speech interference level, perceived noise level, and limiting times for total daily exposure of personnel with and without standard Air Force ear protectors. Refer to Volume 1 of this handbook, "USAF Bioenvironmental Noise Data Handbook, Vol. 1: Organization, Content and Application", AMRL-TR-75-50(1) 1975, for discussion of the objective and design of the handbook, the types of data presented, measurement procedures, instrumentation, data processing, definitions of quantities, symbols, equations, applications, limitations, etc.

PREFACE

This report was prepared by the Biodynamic Environment Branch, Aerospace Medical Research Laboratory, under Project/Task 723104, Measurement and Prediction of Noise Environments of Air Force Operations.

The author acknowledges the efforts of Mr. Robert T. England and Mr. Robert G. Powell who conducted the field measurements, and Mr. John N. Cole who established the data analysis requirements and assisted in the preparation of this report. Mr. Henry Mohlman and Mr. David Eilerman of the University of Dayton assisted in the mechanics of data processing, and Mrs. Norma Peachey typed and prepared the graphics.

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NEAR-FIELD NOISE

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INTRODUCTION

The HDU-13/M Heater is an explosion-proof, electric motor-driven portable ground heater designed to provide heat and ventilating output while operating in an explosive atmosphere such as encountered in the purging of aircraft fuel tanks. This unit is manufactured by the American Air Filter Company, Inc.

This volume provides measured data defining the bioacoustic environments produced by this unit. Such data are essential to evaluate ear protection requirements, limiting personnel exposure times, voice communication capabilities, and annoyance problems associated with operations of the HDU-13/M heater.

This volume is one of a series published by the Aerospace Medical Research Laboratory (AMRL) under the same report number (AMRL-TR-75-50) as a multi-volume handbook that quantifies the noise environments produced at flight/ground crew locations and in surrounding communities by operations of Air Force aircraft and ground support equipment. The far-field, community-type, noise data in the handbook describe the noise produced during *ground operations* of aircraft, ground support equipment, and other ground-based equipment or facilities.

Volume 1 of this handbook discusses the objectives and design of the handbook, the types of data presented, measurement procedures, instrumentation, data processing, definitions of quantities, symbols, equations, applications, limitations, etc. Volume 2 provides a method and data for adjusting the handbook's far-field noise data, which are for standard meteorological conditions (15C temperature, 70% rel humidity, 0.760 meters Hg barometric pressure) to derive comparable data for other meteorological conditions. *Refer to Volumes 1 and 2* (references 1 and 2) for such information because it is not repeated in other handbook volumes.

A cumulative index lists those aerospace systems contained in the handbook, and identifies the specific volumes containing each type of environmental noise data available (i.e., inflight/flight crew and passenger noise, near-field/ground crew noise, far-field/community noise). Volume numbers are assigned sequentially as individual volumes are published. This index is periodically updated as individual volumes are published, and is available upon request from AMRL/BBE, Wright-Patterson AFB, OH 45433. Organizations on the distribution list for the handbook will automatically receive a copy of the updated index as it is generated.

Direct any questions concerning the technical data in this report and other handbook volumes to: AMRL/BBE, Wright-Patterson AFB, OH 45433; Autovon 78-53675 or 78-53664; Commercial (513) 255-3675 or (513) 255-3664.

1. Cole, John N., *USAF Bioenvironmental Noise Data Handbook, Volume 1: Organization, Content and Application*, AMRL-TR-75-50 (1), Aerospace Medical Research Laboratory, Wright-Patterson Air Force Base, Ohio, 1975.

2. Cole, John N., *USAF Bioenvironmental Noise Data Handbook, Volume 2: Procedure to Evaluate Effects of Non-standard Meteorological Conditions on Far-Field Noise*, AMRL-TR-75-50 (2), AMRL, WPAFB, OH, 1975.

NEAR-FIELD NOISE

MEASUREMENTS

A standard HDU-13/M Heater was operated inside, and approximately in the center of a large aircraft hanger (167.6 m 36.5 m wide \times 18.3 m high) on a concrete floor at a normal rated condition of 3500 RPM. The hanger walls and ceiling were not acoustically treated. No aircraft were in the vicinity of the unit while being measured. No far-field acoustic data were acquired because of the relatively close proximity of the hanger walls.

Figure 1 identifies 36 noise measurement locations at a height of 1.5 meters above the concrete apron (nominal ear level of ground crew). The 0 degree reference direction passes through the tow bar. These locations are in the acoustic near-field of the source where the sound wave fronts generally do not spherically diverge and the source appears to be spatially distributed (i.e., not a point source). Consequently, these near-field data cannot be extrapolated to longer distances but do properly define the levels at locations close to the unit.

Near-field measurements were also made at ear level at the operator control panel. Table 1 lists the numeric/alphabetic designators used on the data pages in this report to identify the operator measurement location and test conditions. The designator 1/A means operator location 1 and test condition A. Such a descriptor is essential in many handbook volumes that involve multiple combinations of locations/conditions. It is used in this report to maintain format consistency.

RESULTS

The measured data presented in Table 2 define the sound pressure levels (SPL) produced by the HDU-13/M unit at the 37 specified, near-field locations. This table includes the overall, 1/3 octave band, and octave band levels. From these data one can calculate the variety of measures in Table 3 which are widely used to assess the effects of noise on personnel and their performance.

For data at other intermediate near-field locations (i.e., for radial distances less than 4 meters) you can interpolate between the 36 measured data points.

TABLE 1

MEASUREMENT LOCATION AND TEST CONDITION FOR OPERATOR NOISE MEASUREMENTS

HDU-13/M Heater, Explosion Proof, Duct Type, Portable
Wright Patterson AFB, 2 Nov 1972
FSN 4520-817-1793

Measurement Location

1

Operator Control Panel

Operation

A

3500 RPM

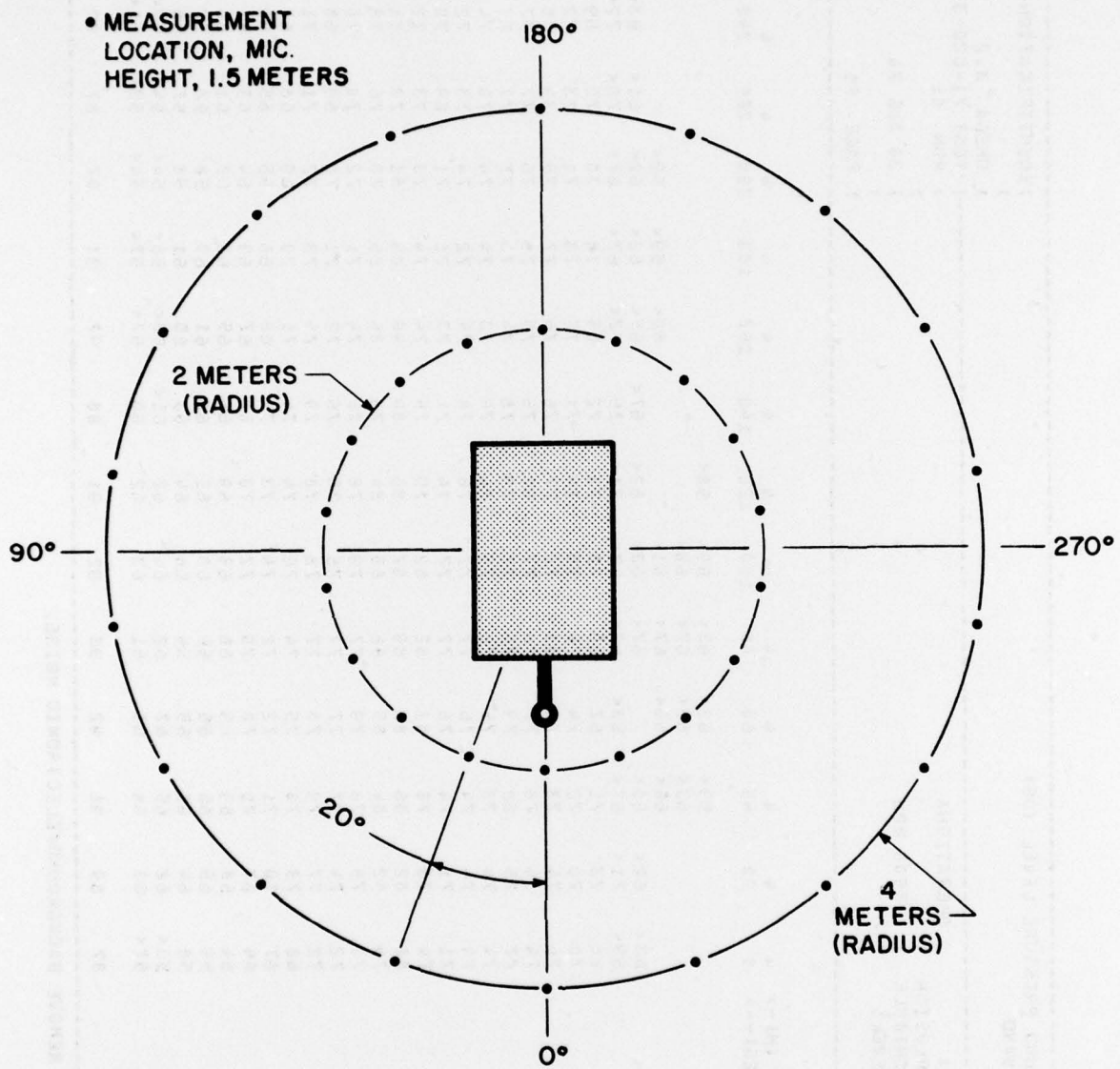


Figure 1. Measurement Locations

TABLE: MEASURED SOUND PRESSURE LEVEL (DB) 1/3 OCTAVE BAND										IDENTIFICATION:									
2										OMEGA 3.2 TEST 71-020-370									
NOISE SOURCE/SUBJECT: (OPERATION:)										RUN 01									
MDU-13/M HEATER-EXPLOSION ()										20 AUG 74									
PROOF, DUCT TYPE PORTABLE ()										PAGE F1									
NEAR FIELD NOISE LEVELS ()																			
(INSIDE HANGER) ()																			
FREQ (HZ)	DISTANCE (M)-->	ANGLE (DEG)-->	4	20	40	60	80	100	120	140	160	180	200	220	240				
25					59<	62<	68<	59<	58<										
31.5					63<	63<	67<	60<											
40					66<	65<	67<	61<											
50			63<	62<	60<	63<	67<	62<	62<	67<	60<	59<	59<	61<	63<				
63			69<	71<	67<	67<	67<	67<	71<	75	72<	67<	67<	70<	72<				
80			68	73	71	67	68	70	73	72	69	70	70	71	69				
100			70	70	72	74	74	75	74	71	72	73	71	73	72				
125			76	74	73	79	81	78	77	76	76	77	75	79	78				
160			74	76	78	77	78	77	80	75	75	76	76	77	77				
200			77	75	80	79	75	77	79	78	74	76	77	77	77				
250			74	74	73	76	76	75	74	74	73	74	74	75	74				
315			74	74	74	76	77	77	76	74	74	72	74	73	72				
400			71	71	74	76	77	77	74	71	73	71	71	69	70				
500			74	73	78	82	82	82	75	75	74	74	73	73	72				
630			81	82	86	86	89	87	85	80	90	89	81	79	81				
800			78	82	84	85	86	85	84	79	86	85	78	76	78				
1000			73	79	78	79	77	79	78	76	74	71	72	70	70				
1250			72	74	77	77	77	76	76	76	72	71	70	69	68				
1600			72	77	79	78	77	78	78	79	75	73	72	71	71				
2000			68	73	74	75	74	76	74	74	71	70	69	68	67				
2500			67	70	71	72	72	74	73	71	68	65	65	65	63				
3150			64	67	70	70	70	72	70	67	67	65	64	63	61				
4000			64	68	69	69	68	69	69	66	65	63	62	61	60				
5000			59	65	66	66	66	68	65	63	61	60	58	58	57				
6300			58	64	65	65	64	66	64	63	60	61	58	57	56				
8000			56<	62	65	63	62	64	62	61<	58<	58<	54<	54<	52<				
10000			57<	63	64	61	61	63	62	60	57<	57<	54<	53<	51<				
OVERALL			87	89	91	92	93	92	91	88	92	91	87	87	87				

< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

TABLE: MEASURED SOUND PRESSURE LEVEL (DB)										IDENTIFICATION:									
1/3 OCTAVE BAND																			
2																			
NOISE SOURCE/SUBJECT: (OPERATION:)																			
HOU-13/M HEATER-EXPLOSION ()																			
PROOF, DUCT TYPE PORTABLE (3500 RPM)																			
NEAR FIELD NOISE LEVELS ()																			
(INSIDE HANGER) ()																			
FREQ (HZ)	DISTANCE (M)-->	4	260	280	300	320	340	4	2	20	40	60	80	100	120	140	2	2	2
ANGLE (DEG)-->	4	260	280	300	320	340	4	2	20	40	60	80	100	120	140	2	2	2	2
25									58<	59<	61<	60<	63<	62<	61<	61<			
31.5																			
40									65<	64<	61<	61<	60<	60<	60<	64<			
50		64<	66<	62<	65<	63<	60<		67<	69<	70<	70<	70<	71<	70<	64<			
63		72<	73<	72<	72<	68<	70<		71<	74	75	74	75	76	74	70<			
80		70	72	72	70	69	68		73	70	70	70	70	71	71	73			
100		71	72	71	71	72	72		72	72	72	76	76	76	74	74			
125		76	76	76	74	74	75		76	76	82	81	81	80	78	76			
160		76	77	76	76	74	75		78	78	81	82	83	82	80	80			
200		75	77	77	75	77	76		79	82	86	85	85	85	84	83			
250		74	75	75	75	73	72		78	80	82	85	85	84	83	82			
315		73	74	75	75	72	72		80	79	79	82	81	82	81	82			
400		68	71	70	70	71	71		73	73	74	76	76	75	75	74			
500		72	73	72	72	73	73		76	77	79	80	81	80	82	76			
630		80	79	83	83	76	82		77	91	95	98	100	99	90	88			
800		77	76	79	79	74	79		77	88	91	94	96	95	87	85			
1000		69	70	70	70	71	73		73	79	83	83	79	81	79	78			
1250		68	68	69	69	70	72		73	74	81	78	83	81	79	78			
1600		69	71	71	71	72	73		73	80	83	84	82	82	80	78			
2000		67	67	68	68	67	68		69	73	77	78	78	77	77	74			
2500		63	63	63	63	65	65		66	69	74	76	75	76	76	73			
3150		61	61	61	61	63	63		63	66	71	73	73	74	72	72			
4000		60	60	61	61	61	61		62	65	72	74	73	74	71	70			
5000		57	57	58	58	59	58		59	63	69	71	70	69	68	67			
6300		55	56	56	56	58	60		58	61	67	70	69	69	67	65			
8000		52<	52<	54<	54<	56<	56<		55<	59<	66	68	68	67	65	63			
10000		51<	51<	52<	52<	55<	55<		55<	59	65	68	67	67	64	62			
OVERALL		86	86	87	87	85	87		88	94	98	100	102	101	95	93			

< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

TABLE: MEASURED SOUND PRESSURE LEVEL (DB) 1/3 OCTAVE BAND		NOISE SOURCE/SUBJECT: (OPERATION:)										IDENTIFICATION:	
2		HOU-13/M HEATER-EXPLOSION ()										OMEGA 3.2	
		PROOF, DUCT TYPE PORTABLE (3500 RPM)										TEST 71-020-370	
		NEAR FIELD NOISE LEVELS ()										RUN 03	
		(INSIDE HANGER)										20 AUG 74	
												PAGE F3	
FREQ (HZ)	DISTANCE (M)-->	2	160	180	200	220	240	260	280	300	320	340	OPERATOR LOCATION TEST CONDITION 1/A
25		61<	59<	59<	59<		65<	61<	64<		58<		67<
31.5							71	68<	64<	63<	61<		66<
40		64<	64<	63<	63<	62<	68<	74	67<	64<	64<	65<	69<
50		67<	66<	66<	66<	67<	71	72	71	70<	67<	68<	71
63		72<	72<	74	74	74	76	78	77	76	73	72<	74
80		74	74	73	73	73	72	77	73	72	72	72	78
100		73	73	74	74	77	77	77	75	72	72	73	80
125		77	79	78	78	83	83	82	78	75	76	77	83
160		78	80	80	80	78	78	76	76	76	77	78	88
200		80	82	82	82	82	79	77	78	80	79	79	88
250		81	80	79	77	76	76	76	75	77	75	76	84
315		80	79	79	76	74	74	76	76	76	76	78	80
400		74	73	73	72	72	71	72	72	74	72	72	79
500		74	76	74	73	72	73	73	73	74	75	74	86
630		90	91	90	90	80	80	79	77	79	82	87	98
800		86	86	86	86	78	77	76	77	76	78	83	94
1000		76	74	75	75	72	71	71	71	71	72	73	80
1250		76	75	74	74	73	70	70	69	70	70	71	80
1600		76	76	74	73	73	71	72	71	70	73	73	83
2000		74	74	71	69	67	67	67	67	68	69	69	80
2500		70	70	69	66	64	64	64	65	65	66	66	77
3150		68	68	68	65	62	62	62	62	62	63	63	75
4000		66	65	65	63	61	61	61	61	61	62	62	73
5000		62	62	61	59	57	57	58	58	59	59	59	72
6300		62	63	61	59	57	57	56	57	58	58	58	70
8000		59<	59<	58<	56<	54<	54<	53<	53<	55<	55<	56<	68
10000		59	59	57<	57<	54<	53<	53<	53<	54<	55<	56<	67
OVERALL		93	94	93	93	89	89	89	87	87	88	90	101

< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

TABLE: MEASURED SOUND PRESSURE LEVEL (DB)		OCTAVE BAND										IDENTIFICATION:	
2												OMEGA 3.2	
												TEST 71-020-370	
												RUN 01	
												20 AUG 74	
												PAGE J1	
NOISE SOURCE/SUBJECT:		(OPERATION:											
HOU-13/M HEATER-EXPLOSION ((
PROOF, DUCT TYPE PORTABLE ((3500 RPM											
NEAR FIELD NOISE LEVELS ((
(INSIDE HANGER)		(
FREQ (HZ)	DISTANCE (M)-->	4	4	4	4	4	4	4	4	4	4	4	4
ANGLE (DEG)-->	0	0	20	40	60	80	100	120	140	160	180	200	240
31.5													
63	72	75	73	68	69	72	72	72	75	77	74	72	73
125	79	78	80	82	82	83	81	82	82	79	79	79	82
250	80	79	82	82	82	81	81	82	81	81	78	80	80
500	82	83	87	88	88	90	88	86	86	90	89	82	82
1000	80	84	86	86	86	87	86	85	82	86	85	80	78
2000	74	79	81	80	80	80	81	80	81	77	75	74	73
4000	68	71	73	73	73	73	74	73	70	70	68	67	66
8000	62	68	69	68	68	67	69	68	66	63	63	61	60
OVERALL	87	89	91	92	92	93	92	91	88	92	91	87	87

TABLE: MEASURED SOUND PRESSURE LEVEL (DB)												
OCTAVE BAND												
IDENTIFICATION:												
2												
NOISE SOURCE/SUBJECT: (OPERATION:)												
HOU-13/M HEATER-EXPLOSION ()												
PROOF, DUCT TYPE PORTABLE (3500 RPM)												
NEAR FIELD NOISE LEVELS ()												
(INSIDE HANGER) ()												
PAGE J2												
OMEGA 3.2												
TEST 71-020-370												
RUN 02												
20 AUG 74												
PAGE J2												
FREQ (HZ)												
DISTANCE (M) -> 4												
ANGLE (DEG) -> 260												
31.5	75	76	74	4	280	300	320	340	4	2	0	2
63	79	80	79	74	72	73	73	73	64	66	66	67
125	79	79	79	79	78	78	78	78	79	79	79	77
250	79	79	80	80	79	78	79	78	79	84	84	85
500	81	81	83	83	78	83	83	83	83	81	81	85
1000	78	78	79	77	77	80	80	80	80	80	80	91
2000	72	73	73	74	74	74	74	74	74	75	75	92
4000	64	64	65	66	66	66	66	66	66	67	67	84
8000	58	58	59	61	61	62	61	62	62	61	61	76
OVERALL	86	86	87	85	87	87	88	88	87	88	88	94
				100	102	101	95	93				

TABLE: MEASURED SOUND PRESSURE LEVEL (DB)												
OCTAVE BAND												
IDENTIFICATION:												
2												
NOISE SOURCE/SUBJECT: (OPERATION:)												
HDD-13/M HEATER-EXPLOSION ()												
PROOF, DUCT TYPE PORTABLE (3500 RPM)												
NEAR FIELD NOISE LEVELS ()												
(INSIDE HANGER) ()												
PAGE J3												
DISTANCE (M) --> 2 2 2 2 2 2 2 2 2 2 2 2 2												
ANGLE (DEG) --> 160 160 160 160 160 160 160 160 160 160 160 160 160												
FREQ (HZ)												
31.5	65	65	64	73	75	70	66	66	72			
63	76	76	77	78	81	79	78	76	80			
125	81	83	83	85	84	81	79	80	81	75		
250	85	85	85	84	81	81	82	82	83	81		
500	90	91	90	81	80	79	81	83	87	87		
1000	87	87	86	80	78	78	78	79	83	83		
2000	78	79	76	73	73	73	73	75	75	75		
4000	71	71	70	65	65	65	66	66	66	66		
8000	65	65	63	60	59	60	61	61	62	62		
OVERALL	93	94	93	89	89	87	87	88	90	90		
101												

TABLE: MEASURES OF HUMAN NOISE EXPOSURE													
3													
NOISE SOURCE/SUBJECT: (OPERATION:)													
HDU-13/M HEATER-EXPLOSION ()													
PROOF, DUCT TYPE PORTABLE (3500 RPM)													
NEAR FIELD NOISE LEVELS ()													
(INSIDE HANGER) ()													
IDENTIFICATION:)													
) OMEGA 3.2													
) TEST 71-020-370													
) RUN 01													
) 20 AUG 74													
) PAGE H1													
DISTANCE (M)--> 4 4 4 4 4 4 4 4 4 4 4 4 4 4													
ANGLE (DEG)--> 0 20 40 60 80 100 120 140 160 180 200 220 240													
HAZARD/PROTECTION													
C-WEIGHTED OVERALL SOUND LEVEL (OASLC IN DB) AT EAR													
A-WEIGHTED OVERALL SOUND LEVEL (OASLA IN DB) AT EAR													
MAXIMUM PERMISSIBLE TIME (T IN MINUTES) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)													
NO PROTECTION													
OASLC 87 89 91 92 93 92 91 88 92 91 87 86 87													
OASLA 84 87 89 90 91 90 86 90 89 84 82 83													
T 480 285 202 170 143 170 202 339 170 202 480 679 571													
MINIMUM QPL EAR MUFFS													
OASLA* 62 63 66 67 68 67 66 63 67 66 63 63 63													
T 960 960 960 960 960 960 960 960 960 960 960 960 960													
AMERICAN OPTICAL 1700 EAR MUFFS													
OASLA* 57 58 60 61 62 61 61 59 61 60 57 58 58													
T 960 960 960 960 960 960 960 960 960 960 960 960 960													
V-51R EAR PLUGS													
OASLA* 60 63 65 66 67 66 65 61 67 66 60 59 60													
T 960 960 960 960 960 960 960 960 960 960 960 960 960													
AMERICAN OPTICAL 1700 EAR MUFFS PLUS V-51R EAR PLUGS													
OASLA* 46 49 51 52 53 52 51 47 52 51 46 45 45													
T 960 960 960 960 960 960 960 960 960 960 960 960 960													
H-133 GROUND COMMUNICATION UNIT													
OASLA* 55 59 60 61 61 61 60 58 60 59 55 55 55													
T 960 960 960 960 960 960 960 960 960 960 960 960 960													
COMMUNICATION													
PREFERRED SPEECH INTERFERENCE LEVEL (PSIL IN DB)													
PSIL 79 82 84 85 85 85 84 81 84 83 78 77 78													
ANNOYANCE													
PERCEIVED NOISE LEVEL, TONE CORRECTED (PNLT IN PNDB)													
TONE CORRECTION (C IN DB)													
PNLT 96 99 102 101 103 102 102 100 103 102 97 95 96													
C 1 2 2 1 2 1 2 1 3 3 2 1 2													

* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.

TABLE: MEASURES OF HUMAN NOISE EXPOSURE										IDENTIFICATION:									
3																			
NOISE SOURCE/SUBJECT: (OPERATION:)																			
HOU-13/M HEATER-EXPLOSION ()																			
PROOF, DUCT TYPE PORTABLE (3500 RPM)																			
NEAR FIELD NOISE LEVELS ()																			
(INSIDE HANGER) ()																			
DISTANCE (M)--> 4 4 4 4 4 4 4 4 4 4																			
ANGLE (DEG)--> 260 260 280 300 320 340 0 2 2 2 2 2 2 2 2 2 2 2 2 2																			
HAZARD/PROTECTION																			
C-WEIGHTED OVERALL SOUND LEVEL (OASLC IN DBC) AT EAR																			
A-WEIGHTED OVERALL SOUND LEVEL (OASLA IN DBA) AT EAR																			
MAXIMUM PERMISSIBLE TIME (T IN MINUTES) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)																			
NO PROTECTION																			
OASLC																			
OASLA																			
T																			
MINIMUM QPL EAR MUFFS																			
OASLA*																			
T																			
AMERICAN OPTICAL 1700 EAR MUFFS																			
OASLA*																			
T																			
V-51R EAR PLUGS																			
OASLA*																			
T																			
AMERICAN OPTICAL 1700 EAR MUFFS PLUS V-51R EAR PLUGS																			
OASLA*																			
T																			
H-133 GROUND COMMUNICATION UNIT																			
OASLA*																			
T																			
COMMUNICATION																			
PREFERRED SPEECH INTERFERENCE LEVEL (PSIL IN DB)																			
PSIL																			
ANNNOYANCE																			
PERCEIVED NOISE LEVEL, TONE CORRECTED (PNLT IN PNDB)																			
TONE CORRECTION (C IN DB)																			
PNLT																			
C																			

* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.

TABLE: MEASURES OF HUMAN NOISE EXPOSURE														
IDENTIFICATION:														
3														
NOISE SOURCE/SUBJECT: (OPERATION:)														
HOU-13/M HEATER-EXPLOSION	(OMEGA 3.2
PROOF, DUCT TYPE PORTABLE	(TEST 71-020-370
NEAR FIELD NOISE LEVELS	(RUN 03
(INSIDE HANGER)	(20 AUG 74
														PAGE H3
HAZARD/PROTECTION														
C-WEIGHTED OVERALL SOUND LEVEL (OASLC IN DB) AT EAR														
A-WEIGHTED OVERALL SOUND LEVEL (OASLA IN DB) AT EAR														
MAXIMUM PERMISSIBLE TIME (T IN MINUTES) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)														
NO PROTECTION														
OASLC	93	94	93	89	88	87	87	88	90					101
OASLA	91	91	90	84	82	82	83	84	88					99
T	143	143	170	480	571	679	571	480	240					36
MINIMUM QPL EAR MUFFS														
OASLA*	68	69	68	66	65	64	63	64	66					76
T	960	960	960	960	960	960	960	960	960					960
AMERICAN OPTICAL 1700 EAR MUFFS														
OASLA*	63	63	63	61	61	59	59	59	61					70
T	960	960	960	960	960	960	960	960	960					960
V-51R EAR PLUGS														
OASLA*	68	68	67	60	59	59	59	61	64					75
T	960	960	960	960	960	960	960	960	960					960
AMERICAN OPTICAL 1700 EAR MUFFS PLUS V-51R EAR PLUGS														
OASLA*	53	53	53	47	46	45	45	46	50					61
T	960	960	960	960	960	960	960	960	960					960
H-133 GROUND COMMUNICATION UNIT														
OASLA*	61	61	60	57	56	55	55	56	58					68
T	960	960	960	960	960	960	960	960	960					960
COMMUNICATION														
PREFERRED SPEECH INTERFERENCE LEVEL (PSIL IN DB)														
PSIL	85	85	84	78	77	77	77	79	82					93
ANNOYANCE														
PERCEIVED NOISE LEVEL, TONE CORRECTED (PNLT IN PNDB)														
TONE CORRECTION (C IN DB)														
PNLT	104	104	103	97	96	94	96	97	100					111
C	3	2	2	2	1	0	1	2	2					3
* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.														